

WHAT IS CLAIMED IS:

1. A method for producing a metal/ceramic bonding substrate wherein a metal member is bonded to at least one side of a ceramic substrate via an active metal containing brazing filler metal, the method comprising the steps of:

bonding a metal member to at least one side of a ceramic substrate via an active metal containing brazing filler metal;

applying a resist on a predetermined portion of a surface of the metal member to etch a part of the metal member, and removing the resist;

etching a part of a metal layer, which is mainly formed of a metal other than an active metal of the active metal containing brazing filler metal, with a chemical; and

selectively etching a part of an active metal layer, which is formed of the active metal and a compound thereof, with a chemical which inhibits the metal member and the metal layer from being etched and which selectively etch the active metal layer, to form a metal circuit on the ceramic substrate.

2. A method for producing a metal/ceramic bonding substrate as set forth in claim 1, which further comprises a step of forming a fillet on a peripheral portion of said metal circuit by chemically polishing said metal circuit after selectively etching the part of said active metal layer of said active metal containing brazing filler metal.

3. A method for producing a metal/ceramic bonding substrate as set forth in claim 2, wherein said fillet has a width of 30 μ m or more.

4. A method for producing a metal/ceramic

bonding substrate as set forth in claim 1, wherein said active metal containing brazing filler metal is arranged in a region which includes a metal circuit forming region for forming said metal circuit on said ceramic substrate and which is wider than the metal circuit forming region.

5. A method for producing a metal/ceramic bonding substrate as set forth in claim 1, wherein said metal other than said active metal of said active metal containing brazing filler metal is at least one kind of metal selected from the group consisting of silver, copper, nickel, tin, zinc and indium.

6. A method for producing a metal/ceramic bonding substrate as set forth in claim 1, wherein said active metal of said active metal containing brazing filler metal is at least one kind of metal selected from the group consisting of titanium, zirconium and hafnium.

7. A method for producing a metal/ceramic bonding substrate as set forth in claim 1, wherein said chemical for selectively etching said active metal layer contains a compound forming a complex with said active metal, an oxidizer and an alkali.

8. A method for producing a metal/ceramic bonding substrate as set forth in claim 7, wherein said alkali is one selected from the group consisting of ammonia, sodium hydroxide and potassium hydroxide, or a material being alkaline when it is dissolved in water.

9. A method for producing a metal/ceramic bonding substrate as set forth in claim 7, wherein said compound forming a complex with said active metal

is an acidic compound.

10. A method for producing a metal/ceramic bonding substrate as set forth in claim 9, wherein said acidic compound is a carboxylic acid type compound.

11. A method for producing a metal/ceramic bonding substrate as set forth in claim 9, wherein said acidic compound is one selected from the group consisting of citric acid, diethylenetriaminepentaacetic acid (DTPA), ethylenediaminetetraacetic acid (EDTA), hydroxyethylethylenediaminetriacetic acid (HEDTA), 1,3-propanediaminetriacetic acid (1,3PDTA), nitrilotriacetic acid (NTA) and hydroxyethylidenediphosphoric acid (HEDT).

12. A method for producing a metal/ceramic bonding substrate as set forth in claim 7, wherein said oxidizer is one selected from the group consisting of hydrogen peroxide, potassium dichromate and potassium permanganate.

13. A method for producing a metal/ceramic bonding substrate as set forth in claim 1, wherein said chemical for selectively etching said active metal layer contains a compound forming a complex with said active metal, an oxidizer and an acid.

14. A method for producing a metal/ceramic bonding substrate as set forth in claim 13, wherein said acid is one selected from the group consisting of hydrochloric acid, sulfuric acid and nitric acid.

15. A method for producing a metal/ceramic bonding substrate as set forth in claim 13, wherein

said compound forming a complex with said active metal is an alkaline compound.

16. A method for producing a metal/ceramic bonding substrate as set forth in claim 15, wherein said alkaline compound is a compound having at least one amino group in its molecule.

17. A method for producing a metal/ceramic bonding substrate as set forth in claim 15, wherein said alkaline compound is ethylenediamine.

18. A method for producing a metal/ceramic bonding substrate as set forth in claim 13, wherein said oxidizer is one selected from the group consisting of hydrogen peroxide, potassium dichromate and potassium permanganate.

19. A method for producing a metal/ceramic bonding substrate as set forth in claim 1, wherein agitation is carried out at the step of selectively etching said part of said active metal layer of said active metal containing brazing filler metal.

20. A method for producing a metal/ceramic bonding substrate as set forth in claim 19, wherein said agitation is one selected from the group consisting of oscillation, convection of liquid, bubbling, and application of ultrasonic wave.

21. A method for producing a metal/ceramic bonding substrate as set forth in claim 1, wherein all or part of a surface of said metal circuit is plated with nickel or a nickel alloy.